Saliva Testing: An Overview

Human saliva can be obtained with ease by non invasive techniques and contains many analytes for screening, monitoring and diagnosis. These include steroid and other nonpeptide hormones, therapeutic drugs, drugs of abuse and antibodies. Both diurnal and monthly profiles of hormone levels parallel traditional serum patterns. Multiple specimens for steroid hormone analysis can be easily collected at home by the patient, to monitor fertility cycles, menopausal fluctuations, stress and other diurnal variations. Drug doses can be monitored without inconvenient and costly visits to blood-drawing facilities. Antibody levels can be determined to screen for infectious diseases. Saliva can be collected directly by spitting into a tube or with one of several devices, each of which has its own special advantages and disadvantages. Salivary levels of steroid hormones and other analytes that are protein bound in serum reflect the unbound and active concentration of the hormone. Saliva can be used as a diagnostic specimen not only to obtain information more inexpensively and efficiently than serum, but also to provide information not readily available from serum testing (Hofman, 2001).

Saliva, as a diagnostic medium, has many advantages over serum for a large variety of testing:

- Since saliva can be collected without venipuncture, it has obvious advantages for multiple noninvasive collections.

- The steroid hormones in saliva reflect the free hormone concentration. Therefore, the salivary content is a more accurate reflection of the active steroid hormones in the body, which are strongly bound in blood by specific binding globulins.

- Many of the hazards associated with blood collection do not apply to saliva. There is no need for sharp objects, such as needles, which have the potential for cross contamination among patients when used improperly and present a danger to health care personnel. Because of the low concentrations of antigens in saliva,
HIV and hepatitis infections are much less of a danger from saliva than from blood.

- Because of diurnal and monthly variations, many steroid hormones need multiple samples collected early in the morning, late at night, or at the same time every day for a month, in order to give meaningful results. Such collections are often very expensive, inconvenient, or impossible to do with blood. In other words, hormone fluctuations are just as important as their actual level at any given point in time. The practice of adding a time component to the evaluation of a patient is known as chronobiology. There are a number of well known chronobiological processes: Seasonal mood changes, the female monthly menstrual cycle, sleep and wake cycles, etc. This information can have important diagnostic significance and can lead to therapeutic strategies that may be easily overlooked by single sample hormone testing.

- Nonpolar analytes are released into saliva through the membranes via a mechanism that is not flow dependent. Therefore, concentrations remain constant relative to blood levels with stimulated and unstimulated collections.

- Most saliva collections for steroids are performed by direct spitting into a tube or absorption onto cotton balls. These samples are not sterile and are subject to bacterial degradation over time. However, most analytes are stable at ambient temperature for about 7 days, so they can be collected and shipped without refrigerant. Absorbing specimens on cotton may contribute interfering substances to the extract. Salivary results for dehydroepiandrosterone (DHEA), testosterone and progesterone may be artificially high when collected on cotton, whereas results for secretory immunoglobulin A (IgA) can be artificially low.
• The most prevalent laboratory technique utilized in measuring various hormones, antigens, and antibodies within the saliva is the Enzyme-Linked Immunosorbent Assay (ELISA). It involves using a prepared solution containing an antibody, specific for the entity being tested. The saliva specimen is exposed to the solution with the known antibody. If the entity being tested for is present in the saliva sample, the antibody will bond to it and the ELISA technique will show evidence of its presence by a color change. This enzyme linked laboratory analysis of saliva is now scientifically well accepted, economically feasible and is an excellent alternative to serum testing.

**Advantages of Saliva Testing**

**Non-Invasive**

• No requirement to draw blood, therefore decreasing patient risk

**Convenience**

• Samples easily collected by patient, at home or at work, and at any time of the day

**Precision**

• Measures the bioactive fraction of steroid hormone at the tissue level.
  • Samples remain stable for about two weeks.